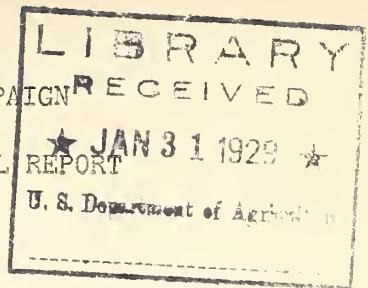


Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

1.9
P60Ba-MH
1928

A SUMMARY OF THE BARBERRY ERADICATION CAMPAIGN
INCLUDING A DIGEST OF THE MONTANA 1928 ANNUAL



By W. L. Popham, Agent,
Office of Cereal Crops and Diseases,
Bureau of Plant Industry,
U. S. Department of Agriculture.*

The barberry eradication campaign is being conducted by the United States Department of Agriculture, in cooperation with thirteen of the upper Mississippi Valley States. The common barberry is the spring host for black stem rust, the most serious disease with which the grain farmer must contend. Experiences of more than ten years of actual field work in the control of stem rust offer conclusive evidence that this bush is the most important factor contributing to stem-rust losses in these States. The removal of all barberry bushes means a marked delay in the development of rust, as this fungus disease can not survive alternate freezing and thawing except in the black stage. The black or winter spores of stem rust can not reinfect wheat in the spring without first attacking the barberry. The destruction of common barberry bushes will remove a necessary link in the annual life history of the rust and will eliminate the local source of stem-rust inoculum.

With the common barberry removed, the only possibility for rust to develop in the North-Central States will be for the infection to spread gradually northward from the Southern States, where the red, or repeating, stage of the rust survives the winter. This northward spread may occur during exceptional seasons, when wind and moisture conditions are favorable, to the extent that rust from this source may develop in late-maturing fields of grain. However, careful study has been given this theory throughout the entire time the campaign has been in progress. The evidence obtained indicates that rust spread from the South will not be a factor of economic importance. Although some rust from this source may reach the North during years of favorable wind and moisture conditions, its appearance will be delayed until the spring wheat crop is advanced beyond the possibility of any appreciable damage resulting.

ORGANIZATION, FINANCING, AND PERSONNEL

Organization and Financing.---The barberry eradication campaign is under Federal supervision and is financed mainly by the United States Department of Agriculture. The project was started in 1918, with a co-operative understanding between the Federal Department, each of the thirteen States included in the barberry eradication area, and several independent organizations interested in small-grain production. The campaign has remained one of the principal projects of the Federal Office of Cereal Crops and Diseases. Excellent cooperation has been received from the State College and the State Department of Agriculture in each of the States. The Conference for the Prevention of Grain Rust, with headquarters in Minneapolis, is an organization of agricultural and business

leaders who are interested in the production of small grains, and who have organized to give financial, as well as cooperative, support to the campaign.

Personnel.--The campaign is directed by the Office of Cereal Crops and Diseases, a branch of the Bureau of Plant Industry, of the United States Department of Agriculture. The work in each of the States is supervised by a State Leader.

In Montana, ten to twelve agents are employed for three to four months during the summer to assist in the field work. These men generally are selected from the upper class men at Montana State College. They are young men who have had at least two years of study in some one of the agricultural courses. The men are selected with reference to their personality, ability, and record in college work.

Before taking up their field duties, these men are given special instruction in methods of eradication and thoroughness of survey. They are also instructed as to how inquiries pertaining to other lines of agriculture should be handled.

SUMMARY OF ACTIVITIES FOR ENTIRE CAMPAIGN

1918-1923

Survey.-- The first few years of the campaign in Montana were spent in making a preliminary survey of the State. It was not believed by those in charge of the work that the common barberry had been very extensively planted, and the supposition was that only the cities and towns and a few of the older settled rural districts would need to be surveyed. The work during these first years was sufficient to indicate the necessity of a complete farm-to-farm survey if the desired results were to be obtained.

In 1923, the actual farm-to-farm survey was begun in a number of representative districts of the State. The objective was twofold; first, to rid these communities of common barberry bushes, and second, to arrive at a more clear conception of just how extensively barberry bushes had been planted in rural communities. The funds available for this work were limited, only four men being employed. At the close of the season the records showed that a total of 24 properties having 824 bushes had been located. More than 700 of these bushes, some of which had escaped cultivation, were found on rural properties.

A farm-to-farm survey of the eastern countries of Montana was started in 1924. Since that time the work has gradually progressed westward, until at the close of the 1928 field season the entire State had been covered by the first survey. A total of 32,261 barberry bushes and seedlings had been found on 386 properties. About 5,000 of these bushes were found growing wild, having developed from seeds scattered by birds or other animals.

In addition to the above-mentioned preliminary survey, some second survey has been carried on in three counties, Richland, Yellowstone, and Flathead. As a result of this work, 1,941 bushes and seedlings were located and destroyed on 15 properties. This makes a grand total of 34,202 bushes and seedlings located on 398 properties during the entire campaign.

The attached tabulated form shows, by counties, the total number of barberry bushes and seedlings found and destroyed in Montana since the beginning of the campaign.

Educational Activities.--- The educational program in connection with barberry eradication has been given equal attention with the actual eradication activities. Upon this phase of the work depends the ultimate success of the campaign. The Conference for the Prevention of Grain Rust, with headquarters in Minneapolis, has provided a great deal of publicity material that otherwise would not have been available.

In Montana, educational work has been conducted with (1) newspapers, in the form of news articles and feature stories; (2) State-wide and county fairs, by means of demonstrations; (3) the general public, through the distribution of form letters, bulletins, and other printed material. In addition, cooperation has been received from the State Superintendent of Public Instruction, which has aided in placing lesson plans outlining the study of stem rust in agricultural and science classes of the high schools of the State. Leading farmers and grain dealers in the State have been supplied at intervals with current information pertaining to the campaign.

PROGRESS OF THE CAMPAIGN DURING 1928

Survey.---Barberry eradication activities were centered in the extreme western counties of the State during 1928. First survey was completed in Granite, Lincoln, Sanders, Mineral, Ravalli, Glacier, and Toole Counties. Three men spent the month of September doing some second survey in Flathead County. During the season 2,803 bushes and seedlings were destroyed on 27 different properties. In this number are included 338 bushes and 2,165 seedlings which had escaped from cultivation. These were found growing on timber land and in pastures in the general vicinity of planted bushes.

Methods of Eradication.---The chemical treatment of barberry bushes as a means of eradication has proved far more successful than the old method of digging. Ten to fifty pounds of crushed rock salt, depending upon the size of the bush, when properly applied to the base of a barberry bush, will kill it and prevent any possibility of the roots sprouting. In a few cases bushes are dug, as the salt treatment might injure other near-by shrubbery.

ESCAPED BARBERRIES

To locate and destroy barberry bushes that have escaped cultivation is one of the most difficult problems encountered in any of the States. In Montana, bushes have been found growing wild in seven counties. In Lake, Flathead, and Yellowstone Counties they were found spreading over rather extensive areas, and frequent surveys for a number of years will be necessary to insure complete eradication.

In Flathead and Lake Counties, many of the bushes found growing wild were bearing fruit, indicating that some time had elapsed since the first seeds were scattered from the old hedge. One such bush found in Flathead County during the past season was more than 9 feet high. It was growing nearly $1\frac{1}{2}$ miles from the location where a few bushes had been planted as a hedge. This bush was estimated to be between 15 and 20 years old.

EDUCATIONAL WORK

The educational program has been continued during 1928. A circular letter and a bulletin pertaining to the campaign were sent to the rural postal box holders in each of the counties where a survey was being conducted. Demonstrations were held at eight county and district fairs. Many window demonstrations were arranged in business houses in the towns where field men were located.

Prepared lesson plans will again be supplied science teachers in the high schools, to aid them in presenting the subject of stem-rust control to their classes.

RUSTS IN MONTANA, 1928.

Stem Rust.--Very little damage resulted from rust in Montana during the past season. Although moisture conditions were favorable for the spread of this disease, no stem rust appeared until the last week in July. During the month of August it spread quite generally over the eastern and northern parts of the State, but with the exception of a few late-sown fields of Supreme wheat the spring-wheat crop was matured to the extent that no damage occurred. The actual stem-rust losses are estimated to be less than for any year of which records are available since the beginning of the campaign.

Leaf Rust.--Leaf rust is an entirely different disease from black stem rust, and the barberry eradication campaign has no bearing whatever on its control. Ordinarily this rust causes very little damage in Montana. It attacks only the leaves and sheaths, and does not injure the stems of the grain. Leaf rust was quite prevalent in some parts of the State this season, being more noticeable in the winter-wheat areas.

Stripe Rust.--During the last few years stripe rust has been appearing in some of the winter-wheat areas of the State. Not until 1928, however, did it reach epidemic proportions. In Flathead County this year all of the Velvet Chaff wheat was infected to some extent. This rust is not as destructive as black stem rust, and little damage occurred even in the fields where the disease was the most severe. The hard red winter wheats were only slightly affected, and the spring wheats matured with hardly a trace of this rust. Stripe rust is not spread by the common barberry.

Crown Rust.--Crown rust of oats has been reported from a few counties in eastern Montana, but in no case has it been found severe enough to cause damage. Crown rust has no relation to the common barberry.

OTHER METHODS OF REDUCING STEM-RUST LOSSES

There are other factors besides barberry eradication that will aid in the reduction of stem-rust losses. The early planting of spring wheat on a well-prepared seed bed will aid materially. To avoid planting varieties of wheat particularly susceptible to black stem rust is important. The work of plant breeders toward the developing of a good milling wheat with rust-resistant qualities will aid in stem-rust control.

FUTURE PLANS FOR BARBERRY ERADICATION IN MONTANA

Future barberry eradication in Montana will take the form of a second survey. Just how much of the territory will require a survey of this type has not been determined. The results of an intensive inspection of certain representative counties to be scouted in 1929 will have a direct influence upon the location and number of counties to be given a second survey.

The educational program will be continued, as the control of black stem rust will depend largely upon the property owners' cooperation in rust-control programs. The destruction of common barberry bushes to control stem rust must be made an accepted practice.

SUMMARY

1. The object of the barberry eradication campaign in Montana is twofold; first, to locate and destroy all barberry bushes now growing in Montana, and second, to inform property owners regarding the description of the bush and its part in the dissemination of rust, so they may destroy any bushes that have been overlooked by field men or that have developed from seed since the survey was made.

2. The first farm-to-farm survey of Montana has been completed. A total of 386 properties, having 12,273 bushes and 19,938 seedlings, was located. Of this number 4,921 bushes, and all of the seedlings, had grown from seed scattered by birds or other animals.

3. Chemical eradication has proved far more satisfactory than the old method of digging. All common barberry bushes found in Montana are killed with crushed rock salt if there does not exist a danger of injuring other shrubbery or trees growing near by.

4. The cleaning up of areas of escaped barberry bushes will be one of the most difficult problems in Montana. It will be necessary to make repeated surveys in counties in which bushes are known to have spread to timber land, fence rows, creek banks, etc.

5. Figures compiled by the United States Department of Agriculture and the Conference for the Prevention of Grain Rust indicate that the average stem-rust losses show a steady trend downward as the many thousands of barberry bushes are removed from the barberry eradication area each year.

6. Stem-rust losses in Montana during the season of 1928 were very slight. A general infection of rust was present throughout eastern and northern Montana late in August, but the spring wheat crop was advanced beyond danger of injury. The first appearance of rust was about two weeks later than usual.

7. Factors important in the control of stem rust are: (1) The removal of the alternate host of the rust by the eradication of the common barberry; (2) The early planting of spring wheat on well-prepared seed beds; and (3) The selection of small-grain varieties least susceptible to stem rust.

TOTAL NUMBERS OF BARBERRY BUSHES AND SEEDLINGS
FOUND AND DESTROYED IN MONTANA DURING THE ENTIRE CAMPAIGN,
FROM 1918 TO 1928, INCLUSIVE

Counties	Barberry Bushes		Seedlings	
	Found	Destroyed	Found	Destroyed
Feaverhead	18	18	0	0
Big Horn	0	0	0	0
Blaine	20	20	0	0
Broadwater	11	11	0	0
Carbon	200	200	215	215
Carter	0	0	0	0
Cascade	150	150	0	0
Chouteau	80	80	0	0
Custer	147	147	0	0
Daniels	0	0	0	0
Dawson	442	442	0	0
Deer Lodge	4	4	0	0
Fallow	0	0	0	0
Fergus	231	231	0	0
Flathead	4,490	4,490	2,452	2,452
Gallatin	391	386	169	169
Garfield	0	0	0	0
Glacier	0	0	0	0
Golden Valley	0	0	0	0
Granite	0	0	0	0
Hill	3	3	0	0
Jefferson	0	0	0	0
Judith Basin	0	0	0	0
Lake	844	844	821	821
Lewis and Clark	483	481	349	349
Liberty	0	0	0	0
Lincoln	22	22	35	35
McCone	0	0	0	0
Madison	64	64	1,500	1,500
Meagher	0	0	0	0
Mineral	3	3	0	0
Missoula	417	417	14,573	14,573
Musselshell	50	50	0	0
Park	388	388	0	0
Phillips	0	0	0	0
Prairie	0	0	0	0
Powder River	0	0	0	0
Pondera	0	0	0	0
Powell	115	115	0	0
Ravalli	636	636	0	0
Richland	14	14	0	0

Counties	Barberry Bushes		Seedlings	
	Found	Destroyed	Found	Destroyed
Roosevelt	0	0	0	0
Rosebud	20	20	0	0
Sanders	432	432	0	0
Sheridan	0	0	0	0
Stillwater	27	27	35	35
Silverbow	8	3	100	0
Sweet Grass	10	10	0	0
Teton	0	0	0	0
Toole	1	1	0	0
Treasure	0	0	0	0
Valley	6	6	0	0
Wheatland	0	0	0	0
Wibaux	127	127	0	0
Yellowstone	2,831	2,830	1,268	1,268
Totals	12,685	12,672	21,517	21,417

Grand total found - 34,202

Grand total destroyed - 34,089